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THE

ONTARIO WATER RESOURCES

COMMISSION

WATER POLLUTION SURVEY

of the

TOWNSHIP OF NORTH HIMSWORTH

DISTRICT OF PARRY SOUND

TD  
380  
.N67  
1967  
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1967

TOWNSHIP OF NORTH HIMSWORTH  
DISTRICT OF PARRY SOUND 1967

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Report on a water pollution  
survey of the township of North  
Himsworth, district of Parry  
Sound.

80829

Report

on a

Water Pollution Survey

of the

TOWNSHIP OF NORTH HIMSWORTH

District of Parry Sound

January 1967

Division of Sanitary Engineering

## INDEX

<u>SECTION</u>	<u>PAGE NO.</u>
INTRODUCTION	1
I GENERAL	1
(1) Location	1
(2) Drainage	2
(3) Topography	2
II WATER USES	2
(1) Water Supply	2
(2) Recreational	4
III WATER POLLUTION	4
(1) Sanitary Waste Disposal	4
IV REFUSE DISPOSAL	4
V DISCUSSION OF SAMPLE ANALYSES	5
(1) Biological Examination	5
(2) Bacteriological Examinations and Chemical Analyses	6
SUMMARY	7
RECOMMENDATIONS	8
APPENDICES	
TABLES	
MAP	

# ONTARIO WATER RESOURCES COMMISSION

## R E P O R T

### INTRODUCTION

The purpose of this survey was to locate and record significant sources of water pollution within the Township of North Himsworth. Surveys of this nature are conducted routinely and upon request throughout the Province of Ontario by the Ontario Water Resources Commission and form a basis for evaluating any existing or potential sources of pollution.

Recommendations are made pertaining to water pollution abatement, and the Commission expects that corrective measures will be taken by those concerned.

Where water-supply and pollution-control works appear desirable or expansions to present facilities are necessary, the Ontario Water Resources Commission has a programme to aid in the construction and financing of these works. The Commission also sponsors courses for plant operators, to assist them in the operation and maintenance of water pollution control facilities and water works systems.

### I GENERAL

#### (1) Location

The Township of North Himsworth has a population of 1,924 (1966 Municipal Directory). It is located in the District of Parry Sound. Callander, the most densely populated portion of the township is situated on Highway 11, nine miles south of the City of North Bay

at the eastern end of Lake Nipissing. There is some residential and commercial development near the intersection of highways 11 and 654, on Highway 654 west of the intersection and in the Terrace Road area.

There is no industry located in the township.

(2) Drainage

The northern portion of the township south of Callander Bay is drained by the Wasi River which empties to Callander Bay. Drainage in the remainder of the township is directed to Callander Bay and Lake Nipissing by local creeks.

(3) Topography

The township is located within the Precambrian shield. The topography is characterized by low hummocky ridges and knolls of granitic gneiss which trend in a northeasterly direction. Bedrock exposure is very extensive.

Overburden deposits, usually consisting of a bouldery, silty till, generally in the order of 5 to 10 feet, are present within depressions between the bedrock ridges. However, in some areas, there are deposits of fine to medium-grained sand with some minor lenses of gravel. The most substantial thicknesses of overburden occur in the form of creek and river terraces.

II WATER USES

(1) Water Supply

There is no municipal water works in the township. Water is obtained from private wells. Reportedly, there are no recent records

of results of bacteriological examinations of these wells, since samples are only submitted on an individual basis.

In a Commission survey during June 1958, 22 per cent of the wells tested were found to be contaminated. Field observations at the time of the 1958 survey attributed this to poor construction and/or location of wells relative to waste-disposal systems. Also, difficulty has been experienced in obtaining an adequate supply from some wells.

At the request of the township, a ground-water survey was conducted in the Callander region by field staff of the Division of Water Resources of this Commission in 1964. The purpose of this survey was to locate a suitable municipal ground-water supply.

The report concluded that the bedrock does not appear capable of producing an adequate yield of ground water for a municipal supply. It was recommended that any test drilling undertaken be limited to areas described as "favourable test-drilling sites" where substantial thickness of overburden appear to be present and should not extend into the bedrock.

International Water Supply Limited have recently completed a test-drilling programme under the direction of the Division of Water Resources of the Commission.

The Commission has authorized the firm of Proctor and Redfern, Consulting Engineers, to prepare reports on water and sewage works requirements for the township. The report will describe the works



applicable for financing under the Provincial programme. The data compiled by the International Water Supply Limited will be utilized by the consulting engineers in the preparation of the report on the water works.

## (2) Recreational

The area is used extensively for resort purposes, and boating, swimming, water sports and fishing are major attractions to the Lake Nipissing area.

## III WATER POLLUTION

### (1) Sanitary Waste Disposal

There are no municipal sanitary sewers. Private sewage disposal is accomplished by septic tanks and tile fields, cesspools or privies. The disposal of sanitary wastes by individual facilities is made difficult by very shallow or non-existent overburden, the location of wells and small lot sizes.

It appears that individual well pollution and impairment of streams that flow to Callander Bay can be attributed to inadequate sanitary waste disposal practices.

The investigation revealed the discharge of contaminants to watercourses from the Callander area and from premises at the junction of highways 654 and 11.

## IV REFUSE DISPOSAL

The township operates and maintains a refuse disposal site at Lot 11, Concession 19. An independent operator provides a

collection service in the Callander area and private dumping is provided for township residents. A burn and cover method of operation is used.

The site appears sufficiently isolated from watercourses to prevent pollution. The nearest creek is approximately 500 yards from the dumping area.

#### V DISCUSSION OF SAMPLE ANALYSES

Samples were collected from local watercourses and from Callander Bay. The results of the laboratory analyses of these samples are recorded in the appended tables I and II. The location of the sampling points are shown on the enclosed map of the township.

##### (1) Biological Examination

Surface and depth (15 feet) samples were collected from the locations listed in Table I as A to F inclusive. The samples were examined microscopically in the laboratory.

The samples taken at the 15-foot depth contained filamentous blue-green "algae" Aphanizomenon. The quantity of algae presented a typical "water-bloom" condition. The Aphanizomenon was distributed through the water and had risen to the surface thereby producing this bloom condition.

In all biological samples, ciliates, rotifers, microcrustaceans and small quantities of organic material were noted.

The above information, together with the information accumulated on Lake Nipissing in the past indicates that the lake is well

advanced in terms of its basic capacity to produce and support aquatic plant and animal life. The degree of productivity will be influenced by the availability of nutrients, such as those contained in the effluent from a sewage-treatment installation.

The Commission has informed the consulting engineers, Proctor and Redfern, of the importance of designing or locating the proposed waste treatment facility so that the effluent will not be discharged to the bay.

(2) Bacteriological Examinations and Chemical Analyses

The results of the bacteriological examinations of the creek samples in the High Street area of Callander and rear of the Main Street business premises showed an excessive coliform count. Domestic wastes from the central section of Callander are gaining access to Callander Bay via the drainage ditches. The incidence of increasing coliform counts in the perimeter samples taken in the bay confirms this. The chemical analyses of the creek samples included tests which indicated that anionic detergent (ABS) was also present. The source of these contaminants is undoubtedly from malfunctioning sewage disposal facilities, as ABS does not occur naturally.

The chemical analyses of samples taken from the Wasi River in the vicinity of Highway 654 showed the presence of phenolic compounds. A leak in the gasoline line to the pumps at the George Aro Esso Station, at the junction of highways 11 and 654 was the apparent source of these compounds. The leak has been repaired and reclaiming

of the spilled product, which has saturated the ground, was progressing at the time of the investigations.

It was confirmed by dye tests that effluent from the sewage disposal facilities at the Esso Station was gaining access to the river near the Highway 11 bridge. The results of the laboratory analyses of a sample of the effluent at the recorded point of access to the stream are appended in Table II. Imperial Oil Limited has agreed to take remedial measures to prevent the discharge of these contaminating wastes to the watercourse.

#### SUMMARY

A water pollution survey was carried out in the Township of North Himsworth during September and October 1966.

The survey confirmed that contaminating wastes were being discharged to Callander Bay through local drainage conduits.

Algae determinations indicated that Lake Nipissing is already well advanced in terms of its basic capacity to produce and sustain algae and aquatic animal and plant life. The discharge point of the proposed water pollution control facilities should therefore be established outside Callander Bay.

Proctor and Redfern, Consulting Engineers, have been authorized by the Commission to determine the water and sewage works requirements for the township. The firm has indicated that it plans to locate the sewage treatment facility so that direct discharge to the bay will not be necessary.

The findings of this survey confirm the necessity for immediate communal sewerage facilities for the Callander area. Evidence of a malfunctioning sewage disposal facility at the junction of highways 654 and 11 and the trend towards development in this portion of the township indicates that sewer services should also be provided for this area.


#### RECOMMENDATIONS

1. The Township of North Himsworth should initiate a water pollution control programme, in conjunction with the proposed Provincial programme, which will provide sanitary sewer services to all problem areas.

2. Imperial Oil Limited should continue their efforts to prevent the discharge of contaminants from the Aro Esso Station to the Wasi River.

/elc

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## APPENDIX

### GLOSSARY OF TERMS

Bacteriological Examinations - The Membrane Filter technique is used to obtain a direct enumeration of coliform organisms. These organisms are the normal inhabitants of the intestines of man and other warm-blooded animals. They are always present in large numbers in sewage and are, in general, relatively few in number in other stream pollutants. The results are reported as MF coliform count per 100 millilitres.

Biochemical Oxygen Demand (BOD) - The BOD test indicates the amount of oxygen required for stabilization of the decomposable organic matter found in the sewage, sewage effluent, polluted waters or industrial wastes by aerobic biochemical action. The time and temperature used are 5 days and 20°C respectively.

Oils and Ether Soluble Materials - These include oils and all other ether soluble materials such as tarry substances and greases. The presence of these pollutants renders water difficult and sometimes impractical to treat, either for industrial or domestic use. Oils make the stream unsightly and the water unfit for bathing. They coat water craft and are a hazard to wild fowl.

Phenolic Compounds - Phenols and phenolic equivalents were measured by the Gibbs Method with modifications. Phenols react with chlorine to produce intensely aromatic compounds. These compounds, even when highly diluted, may give a taste and odour to the water which is variously described as medicinal, chemical or iodoform. Phenols taint fish and are toxic to fish, depending on the concentration. Normal water contains no phenolic compounds.

Solids - The analyses for solids include tests for total, suspended and dissolved solids. The former measures both the solids in solution and in suspension. Suspended solids indicate the measure of undissolved solids of organic or inorganic nature, whereas the dissolved solids are a measure of those solids in solution.

Total Kjeldahl - Total Kjeldahl is the measure of total nitrogenous material present except that measured as nitrite and nitrate nitrogens. The total Kjeldahl less the ammonia nitrogen measures the organic nitrogen present. Ammonia and organic nitrogen determinations are important in determining the availability of nitrogen for biological utilization. The normal range in surface waters for total Kjeldahl would be 0.1 to 0.5 parts per million.

Alkyl Benzene Sulfonate (ABS) - The alkyl benzene sulfonate portion of the anionic detergents is reported in ppm. The test is generally employed to detect the presence of domestic wastes. The popular use of synthetic detergents for general cleaning purposes has resulted in the incidence of residual ABS in domestic waste discharges.

As an objective, the ABS concentration should not exceed 0.5 ppm in water used for domestic purposes.

(i) Rotifers (Phylum Rotifera) - Microscopic aquatic animals, primarily free-living fresh water forms that occur in a variety of habitats. Approximately 75 per cent of the known species occur in the littoral zone (shoreward region of a body of water) of lakes and ponds. The more dense populations are associated with a substrate of submerged aquatic vegetation. Most forms ingest fine organic detritus for food whereas others are predaceous.

(ii) Ciliates (Phylum Protozoa) - Single-celled organisms which are divided into four main classes; Ciliata, Sarcodina, Flagellata and Sporozoa. The ciliates are the largest and most homogenous of the protozoan classes. All possess cilia or short hair-like processes at some time in their life cycle. These cilia beat rhythmically and drive these protists through the water in which they live.

(iii) Microcrustacean - The class Crustacea is the only large class of arthropods that is primarily aquatic. These animals are characterized by a rigid outer covering, jointed appendages and gills. Examples are crayfish, crabs, barnacles, water-fleas and sow bugs. Microcrustaceans are organisms of a similar structure but are invisible to the naked eye. Examples of microcrustaceans are Cyclops, Daphnia and Cladocera.

(iv) Water-Bloom - This is described as a visible concentrated growth or aggregation of plankton (Plankton are organisms of relatively small size, mostly microscopic, that have either relatively small powers of locomotion or that drift in the water with waves, currents and other water motion).

(v) Blue-Green Algae - Blue-green algae are a group of algae with a blue pigment, in addition to the green chlorophyll. The proportion of blue-greens with respect to other algae is dependent on both the time of the year and the chemical composition of the water. These algae are usually the dominant organisms during the late summer and early fall. Not infrequently, in certain lakes, there is a development of one or two species to such an extent that the water is discoloured by them. The "water-bloom", which may also be caused by algae of other classes, may be of sporadic occurrence or may occur



annually. Instances have been recorded where the blooming of a lake has caused the death of fish or where the water is injurious to livestock drinking it, but such effects are very uncommon. The disagreeable tastes and odours caused by the death and decay of the algae causing the bloom are of far greater economic importance, especially in lakes and reservoirs used for domestic water supplies.

(vi) Anabaena and Aphanizomenon - (sometimes macroscopic in size) are filamentous forms of blue-green algae. Both are capable of collecting in large masses sufficient to form a "water-bloom" condition. Both may impart to the water a foul odour. This odour probably develops from products of decomposition as large numbers of these groups begin to die off.

Water Quality and Effluent Objectives - The desirable objectives for all surface waters in the Province of Ontario are as follows:

5-Day BOD	- not greater than 4 ppm
MF Coliform Count Median Value	- not greater than 2,400/100 ml
Phenolic Equivalents - average	- not greater than 2 ppb
- maximum	- not greater than 5 ppb
pH Range	- 6.7 to 8.5

A few pertinent maximum concentration limits of contaminants in storm sewers, sewage treatment plant and industrial waste effluents are listed below. Adequate protection for surface waters, except in certain specific instances influenced by local conditions, should be provided if the following concentrations and pH range are not exceeded.

5-Day BOD	- not greater than 15 ppm
Suspended Solids	- not greater than 15 ppm
Phenolic Equivalents	- not greater than 20 ppb
Ether Solubles (oil)	- not greater than 15 ppm
pH Range	- 5.5 to 9.5
Iron	- not greater than 17 ppm



TOWNSHIP OF NORTH HINSWORTH

SAMPLE ANALYSES

TABLE I (CALLANDER BAY)

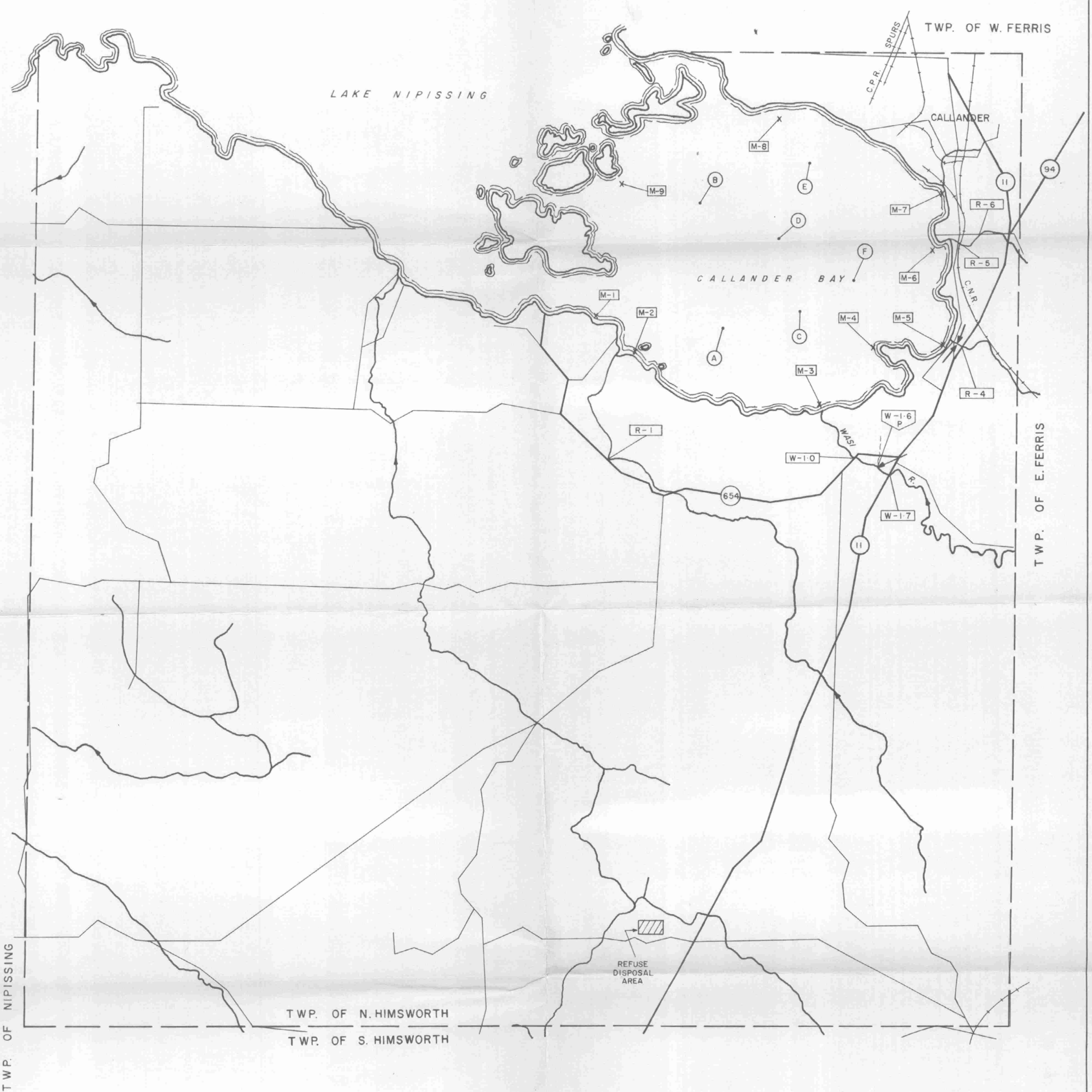
SAMPLING POINT NO.	DESCRIPTION	DATE	5-DAY BOD (PPM)	SOLIDS			M.F. COLIFORM COUNT/100 ML	TOTAL KJELDAHL AS N	PHOSPHOROUS AS PO <sub>4</sub>	BIOLOGICAL EXAMINATION
				TOTAL (PPM)	SUSP. (PPM)	DISS. (PPM)				
A	CALLANDER BAY PERIMETER AND GRID SAMPLING POINT LOCATIONS AS SHOWN ON ENCLOSED MAP.	SEPT. 15/66	1.4	52	2	50	16	0.33	0.06	THE RESULTS OF THE BIOLOGICAL EXAMINATION ARE DISCUSSED IN THE BODY OF THE REPORT.
B	"	SEPT. 15/66	1.6	76	2	74	90	0.40	0.06	"
C	"	SEPT. 15/66	1.2	34	2	32	60	0.40	0.08	"
D	"	SEPT. 15/66	1.7	32	1	31	44	0.43	0.06	"
E	"	SEPT. 15/66	1.8	70	2	68	64	0.46	0.06	"
F	"	SEPT. 15/66	1.2	54	3	51	48	0.55	0.06	"
M-1	"	SEPT. 15/66	-	-	-	-	124	-	-	"
M-2	"	SEPT. 15/66	1.5	54	12	42	4,200	1.20	0.14	"
M-3	"	SEPT. 15/66	7.8	58	10	48	670	0.26	0.12	"
M-4	"	SEPT. 15/66	-	-	-	-	16	-	-	"
M-5	"	SEPT. 15/66	1.5	40	6	34	1,900	0.65	0.08	"
M-6	"	SEPT. 15/66	1.5	42	8	34	8,200	1.05	0.22	"
M-7	"	SEPT. 15/66	-	-	-	-	132	-	-	"
M-8	"	SEPT. 15/66	-	-	-	-	500	-	-	"
M-9	"	SEPT. 15/66	-	-	-	-	1,200	-	-	"

TOWNSHIP OF NORTH HIMSWORTH

SAMPLE ANALYSES

TABLE 11 WASI RIVER AND CREEK SAMPLES

SAMPLING POINT NO.	DESCRIPTION	DATE	5-DAY BOD (PPM)	TOTAL (PPM)	SOLIDS		M.F. COLIFORM COUNT/100 ML	ANIONIC DETERGENTS		PHENOLS IN PPB	ETHER SOLUBLES
					SUSP. (PPM)	DISS. (PPM)		AS	ABS		
W-1.0	WASI RIVER AT HWY. #654.	SEPT. 15/66	0.4	40	8	32	1,500	-	-	4	0
W-1.6D	LEACHATE TO WASI RIVER NEAR BRIDGE AT HWY. #11.	OCT. 22/66	90	930	664	266	240,000+	-	-	-	-
W-1.7	WASI RIVER AT HWY. #11.	SEPT. 15/66	2.0	86	29	57	2,400	-	-	4	0
R-1	CREEK AT HWY. #654.	SEPT. 15/66	1.4	136	5	131	900	-	-	-	-
R-4	CREEK AT HWY. #11 AND MAIN STREET SOUTHERN (CUT-OFF).	SEPT. 15/66	1.6	96	3	93	600	0.0	-	-	-
R-5	CREEK REAR OF MAIN STREET.	SEPT. 15/66	3.0	182	1	181	37,000	0.2	-	-	-
R-6	CREEK AT HIGH STREET.	SEPT. 15/66	1.3	110	3	107	108,000	0.1	-	-	-



# LEGEND

- (B) - SAMPLING POINTS DEPTH AND SURFACE SAMPLE FOR BIOLOGICAL DETERMINATION
- [M-1] - PERIMETER SAMPLING POINT CALLANDER BAY
- [W-1-0] - STREAM SAMPLING POINT SHOWING MILEAGE
- [R-4] - LOCAL CREEK SAMPLING POINT
- [W-1-6 P] - SEWAGE LEACHATE FROM AROS SEPTICTANK EFFLUENT

ONTARIO WATER RESOURCES COMMISSION	
TOWNSHIP OF NORTH HIMSWORTH	
WATER POLLUTION SURVEY	
1967	
SCALE :	2640 1320 0 2640 FEET
DRAWN BY: L.L. BROOME	DATE: JANUARY, 1967
CHECKED BY: D.C.	DRAWING No: 67-6